

## 299-W11-81 (A7323) Log Data Report

### Borehole Information:

<b>Borehole:</b> 299-W11-81 (A7323)		<b>Site:</b> 216-T-17 Trench			
<b>Coordinates (WA St Plane)</b>		<b>GWL<sup>1</sup> (ft):</b> None		<b>GWL Date:</b> 08/29/05	
<b>North (m)</b>	<b>East (m)</b>	<b>Drill Date</b>	<b>Ground Level Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
136801.847	567024.2	10/82	706.02	52	Cable

### Casing Information:

<b>Casing Type</b>	<b>Stickup (ft)</b>	<b>Outer Diameter (in.)</b>	<b>Inside Diameter (in.)</b>	<b>Thickness (in.)</b>	<b>Top (ft)</b>	<b>Bottom (ft)</b>
Welded steel	4.7	8 5/8	8	5/16	4.7	52

### Borehole Notes:

The logging engineer measured the casing diameter using a caliper and steel tape. Water was in the bottom of the borehole at 52.8 ft; log data acquisition was started at 52 ft. Logging data acquisition is referenced to the top of casing.

### Spectral Gamma Logging System (SGLS) Equipment Information:

<b>Logging System:</b> Gamma 1E		<b>Type:</b> SGLS (70%) SN: 34TP40587A
<b>Effective Calibration Date:</b> 03/04/05	<b>Calibration Reference:</b> DOE-EM/GJ864-2005	
<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0		

### High Rate Logging System (HRLS) Equipment Information:

<b>Logging System:</b> Gamma 1C		<b>Type:</b> HRLS SN: 39-A314
<b>Effective Calibration Date:</b> 04/06/05	<b>Calibration Reference:</b> DOE-EM/GJ865-2005	
<b>Logging Procedure:</b> MAC-HGLP 1.6.5, Rev. 0		

### Spectral Gamma Logging System (SGLS) Log Run Information:

<b>Log Run</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4 Repeat</b>	
Date	08/29/05	08/29/05	08/29/05	08/29/05	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	52.0	23.0	17.0	18.0	
Finish Depth (ft)	23.0	17.0	5.0	10.0	
Count Time (sec)	100	20	100	100	
Live/Real	R	R	R	R	

Log Run	1	2	3	4 Repeat	
Shield (Y/N)	N	N	N	N	
MSA Interval (ft)	1.0	1.0	1.0	1.0	
ft/min	N/A <sup>2</sup>	N/A	N/A	N/A	
Pre-Verification	AE099CAB	AE099CAB	AE099CAB	AE099CAB	
Start File	AE099000	AE099030	AE099037	AE099050	
Finish File	AE099029	AE099036	AE099049	AE099056	
Post-Verification	AE099CAA	AE099CAA	AE099CAA	AE099CAA	
Depth Return Error (in.)	N/A	N/A	- 1	0	
Comments	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	No fine-gain adjustment	

### **High Rate Logging System (HRLS) Log Run Information:**

Log Run	5	6 Repeat			
Date	08/29/05	08/29/05			
Logging Engineer	Spatz	Spatz			
Start Depth (ft)	25.0	22.0			
Finish Depth (ft)	17.0	19.0			
Count Time (sec)	300	300			
Live/Real	R	R			
Shield (Y/N)	N	N			
MSA Interval (ft)	1.0	1.0			
ft/min	N/A	N/A			
Pre-Verification	AC140CAB	AC140CAB			
Start File	AC140000	AC140009			
Finish File	AC140008	AC140012			
Post-Verification	AC140CAA	AC140CAA			
Depth Return Error (in.)	N/A	N/A			
Comments	No fine gain adjustment	No fine gain adjustment			

### **Logging Operation Notes:**

Logging was conducted with a centralizer on each sonde. Measurements are referenced to the top of casing. Maximum logging depth was 52.0 ft, approximately 1 ft above water in the borehole. Repeat sections were collected in this borehole for both systems to evaluate the logging systems' performance.

### **Analysis Notes:**

<b>Analyst:</b>	Henwood	<b>Date:</b>	08/31/05	<b>Reference:</b>	GJO-HGLP 1.6.3, Rev. 0
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Pre-run and post-run verifications for the logging systems were performed before and after data acquisition. Acceptance criteria were met for all systems.

A casing correction for 5/16-in.-thick casing was applied to the spectral log data (SGLS and HRLS) from the ground surface to 52 ft.

SGLS and HRLS spectra were processed in batch mode using APTEC SUPERVISOR to identify individual energy peaks and determine count rates. Concentrations were calculated with EXCEL worksheet templates identified as G1Emar05.xls for the SGLS and G1Capr05.xls for the HRLS using efficiency functions and corrections for casing, water, and dead time as determined from annual calibrations. Dead time corrections are applied where dead times exceed approximately 11 percent for both

the SGLS and HRLS. Where SGLS dead time exceeds 40 percent, HRLS data are substituted. No correction for water was necessary.

### **Log Plot Notes:**

Separate log plots are provided for the man-made radionuclides ( $^{137}\text{Cs}$  and  $^{60}\text{Co}$ ) detected in the borehole, naturally occurring radionuclides ( $^{40}\text{K}$ ,  $^{238}\text{U}$ ,  $^{232}\text{Th}$  [KUT]), a combination of man-made, KUT, and total gamma plotted with dead time. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, casing corrections, or water corrections. Repeat log sections are also included where appropriate.

A comparison plot of the Westinghouse Hanford Company Radionuclide Logging System (RLS) data acquired in 1992 and the current SGLS data is provided.

### **Results and Interpretations:**

$^{137}\text{Cs}$  was detected in this borehole between the ground surface and the bottom of the borehole (52 ft). The maximum concentration was measured at approximately 13,000 pCi/g at 20 ft in depth.

$^{60}\text{Co}$  was detected between 22 and 30 ft and at 33 ft. The maximum concentration was measured at 0.2 pCi/g at 28 ft.

The comparison plot of RLS data decayed to 2005 and the current SGLS data indicate no significant changes in the profile for  $^{137}\text{Cs}$  or  $^{60}\text{Co}$  since 1992.

The repeat sections for the SGLS and HRLS indicate good agreement.

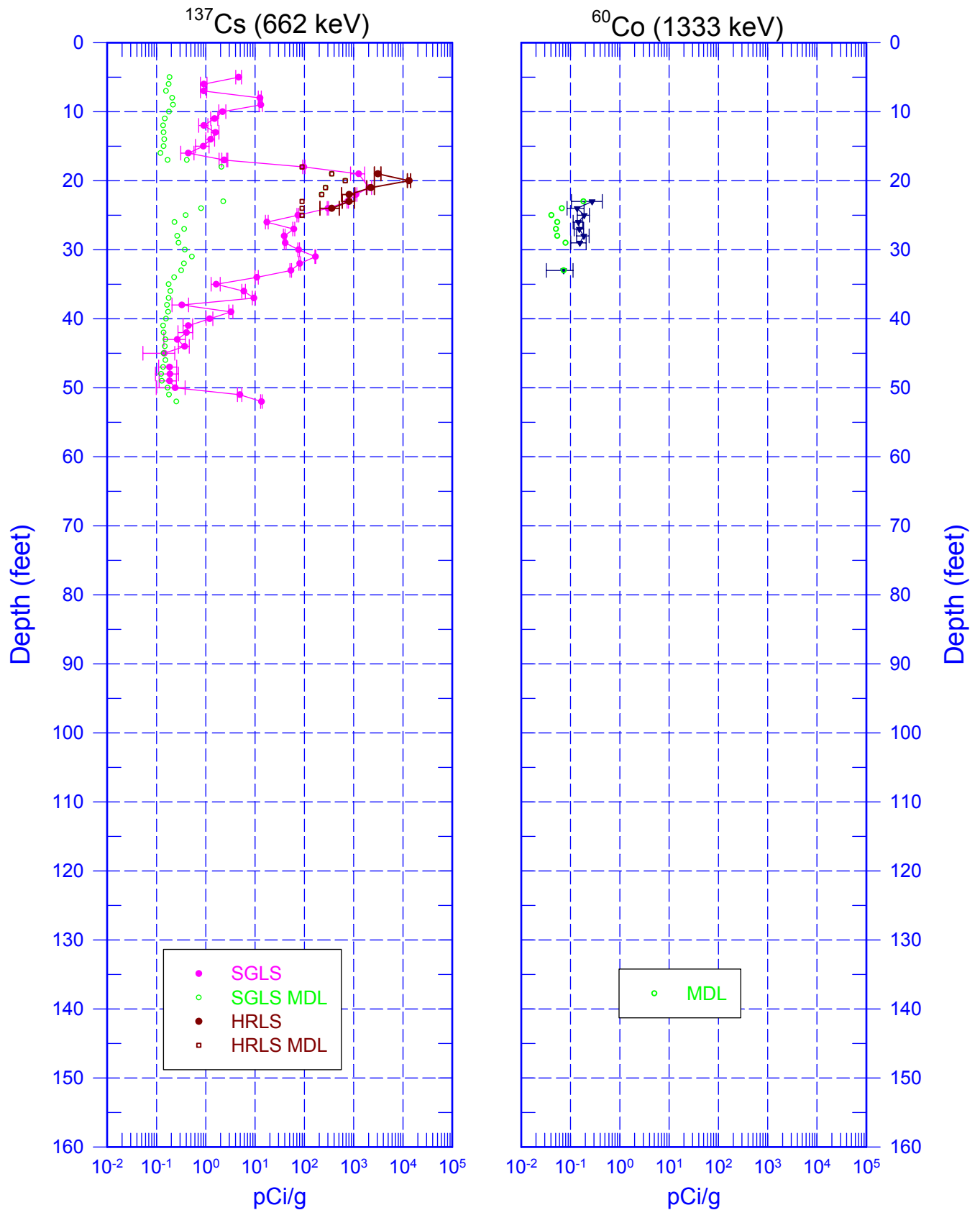
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<sup>1</sup> GWL – groundwater level

<sup>2</sup> N/A – not applicable

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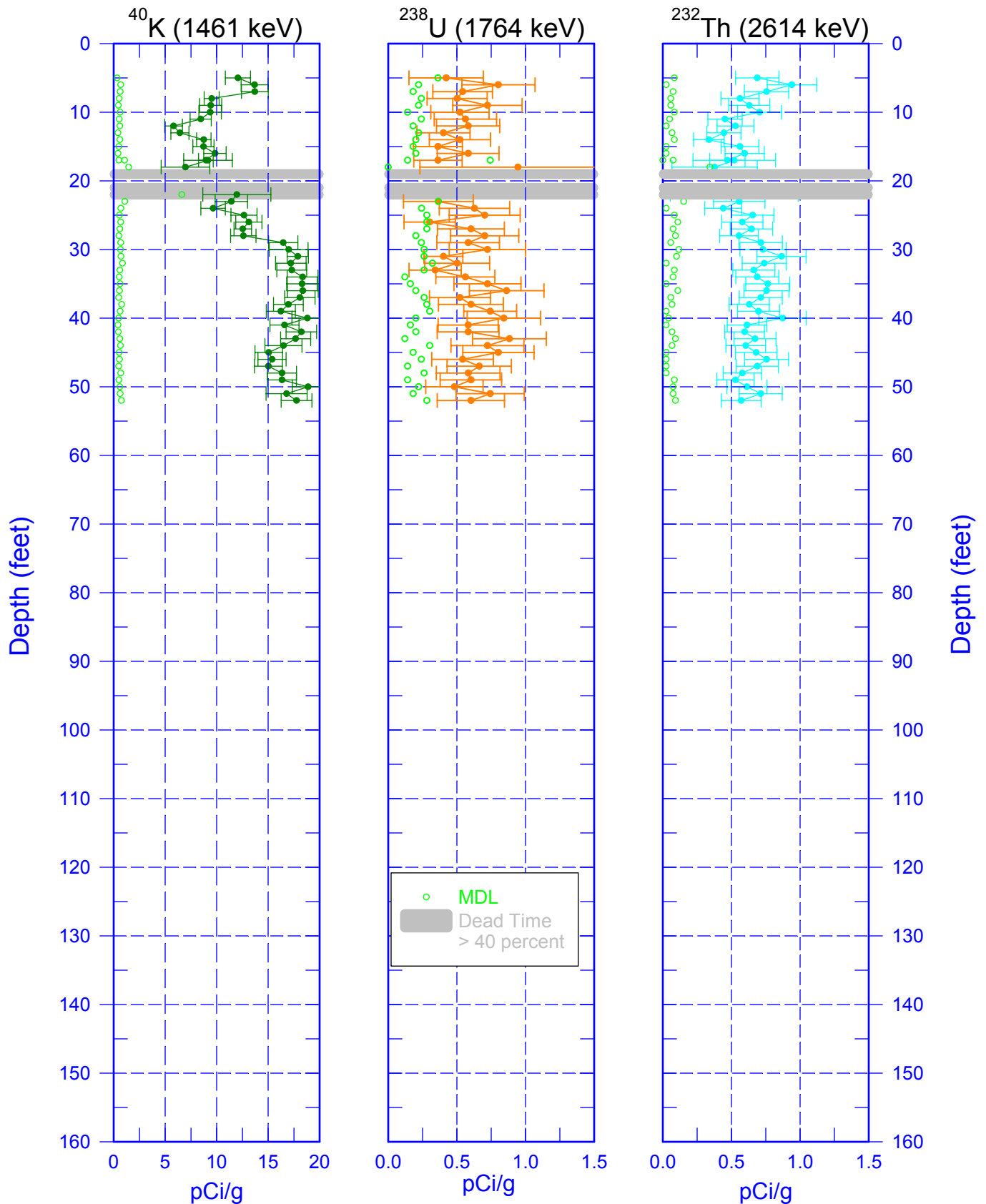
## Man-Made Radionuclides



Zero Reference = Top of Casing

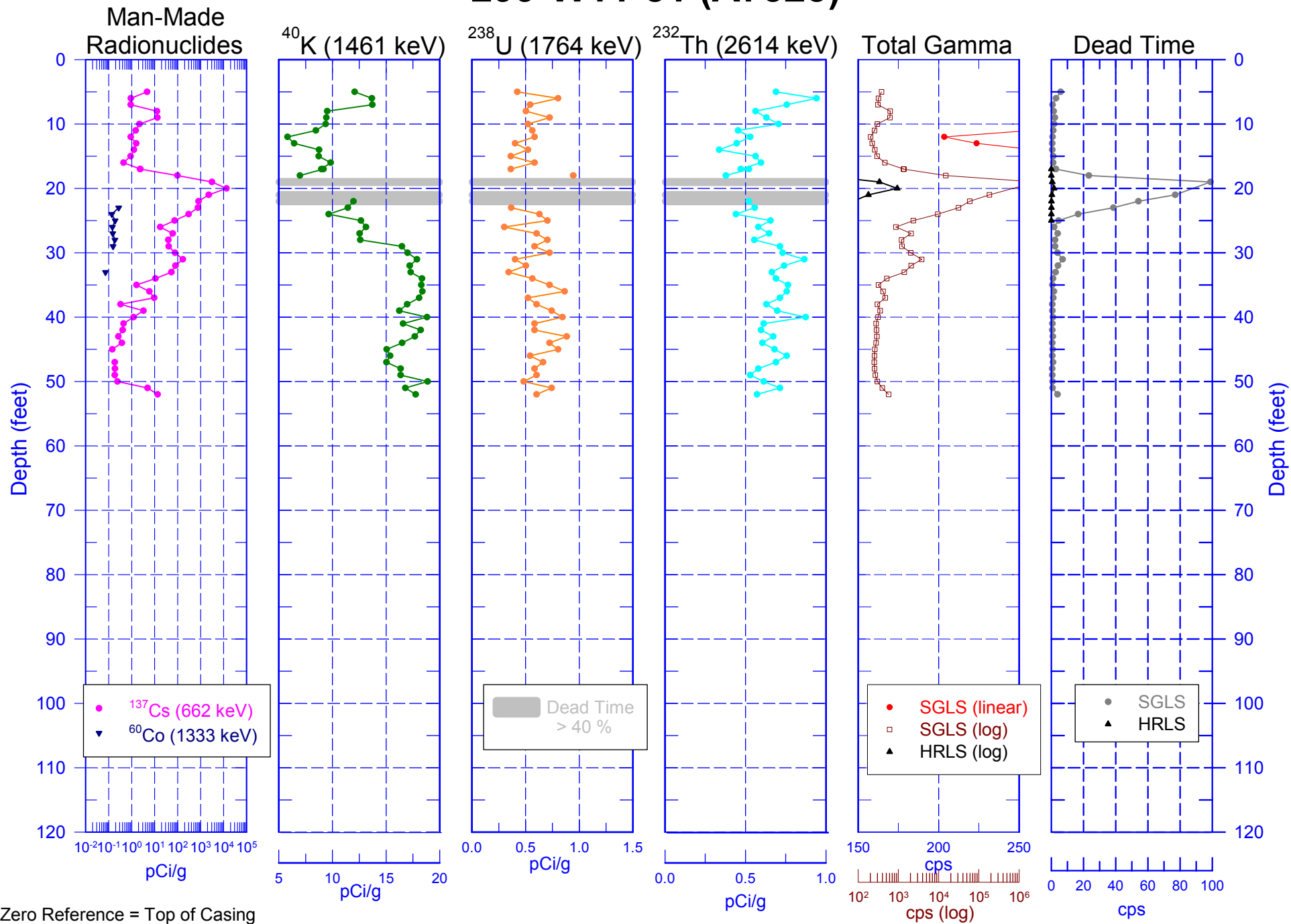
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## Natural Gamma Logs



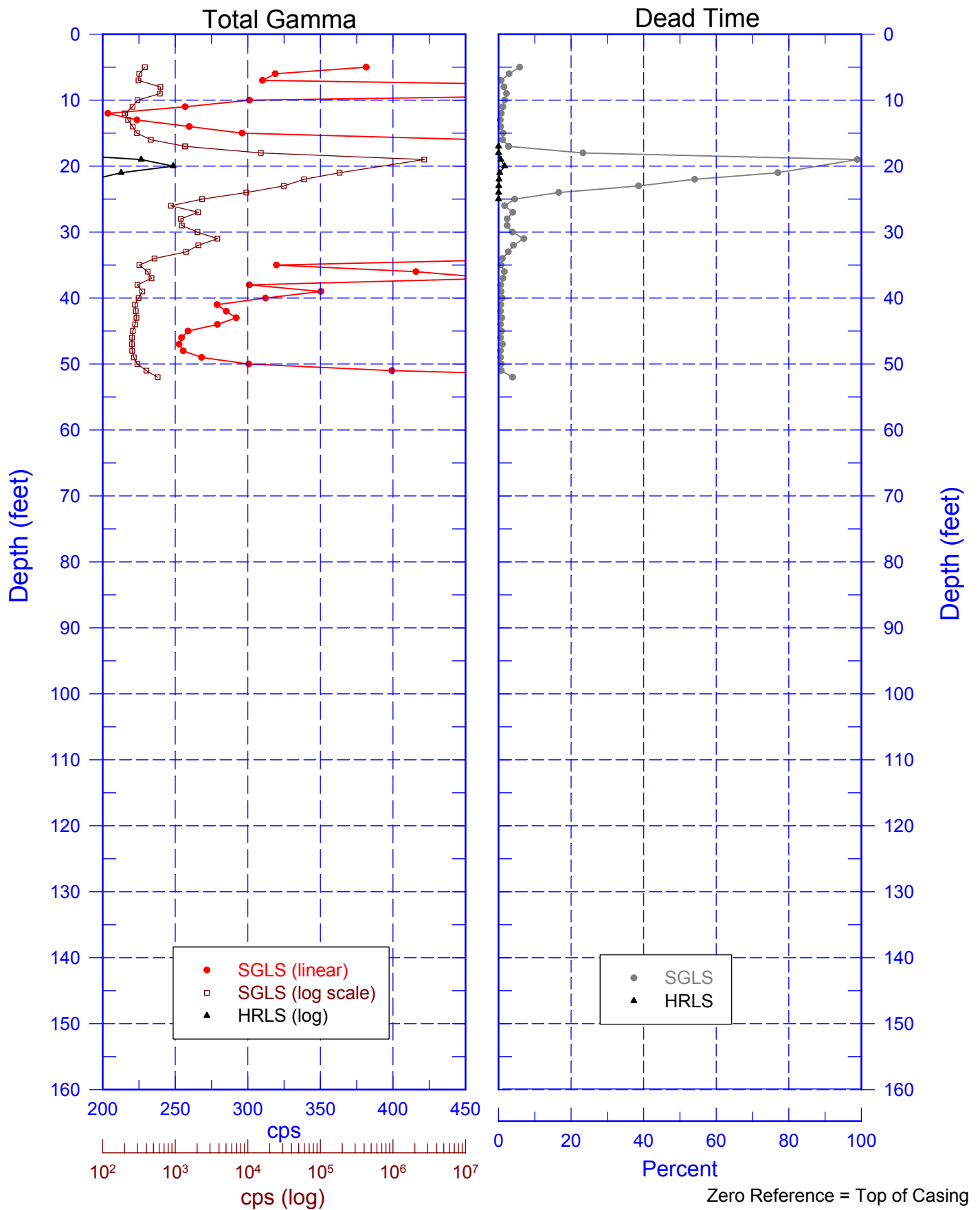
Zero Reference = Top of Casing

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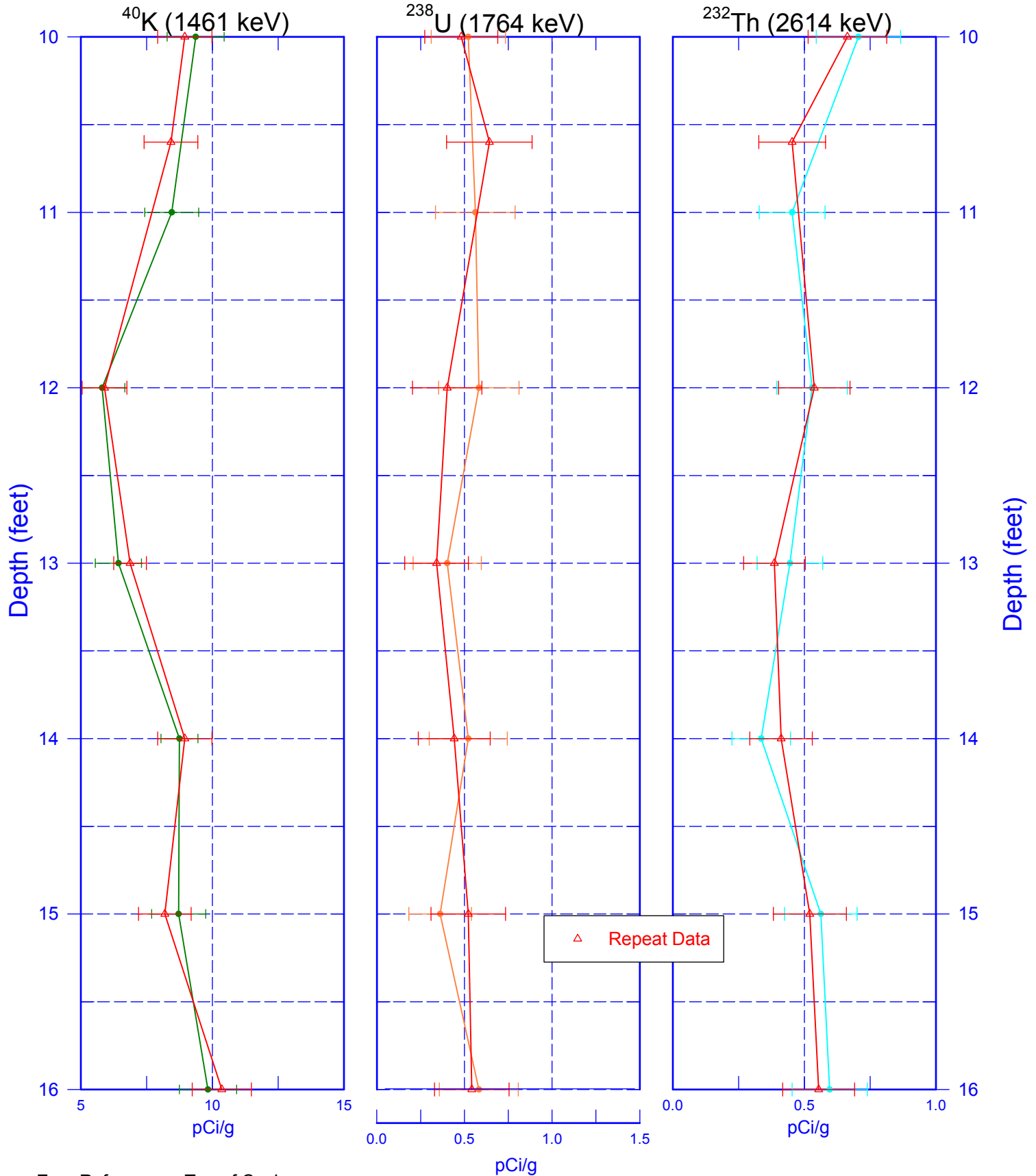
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## Total Gamma & Dead Time



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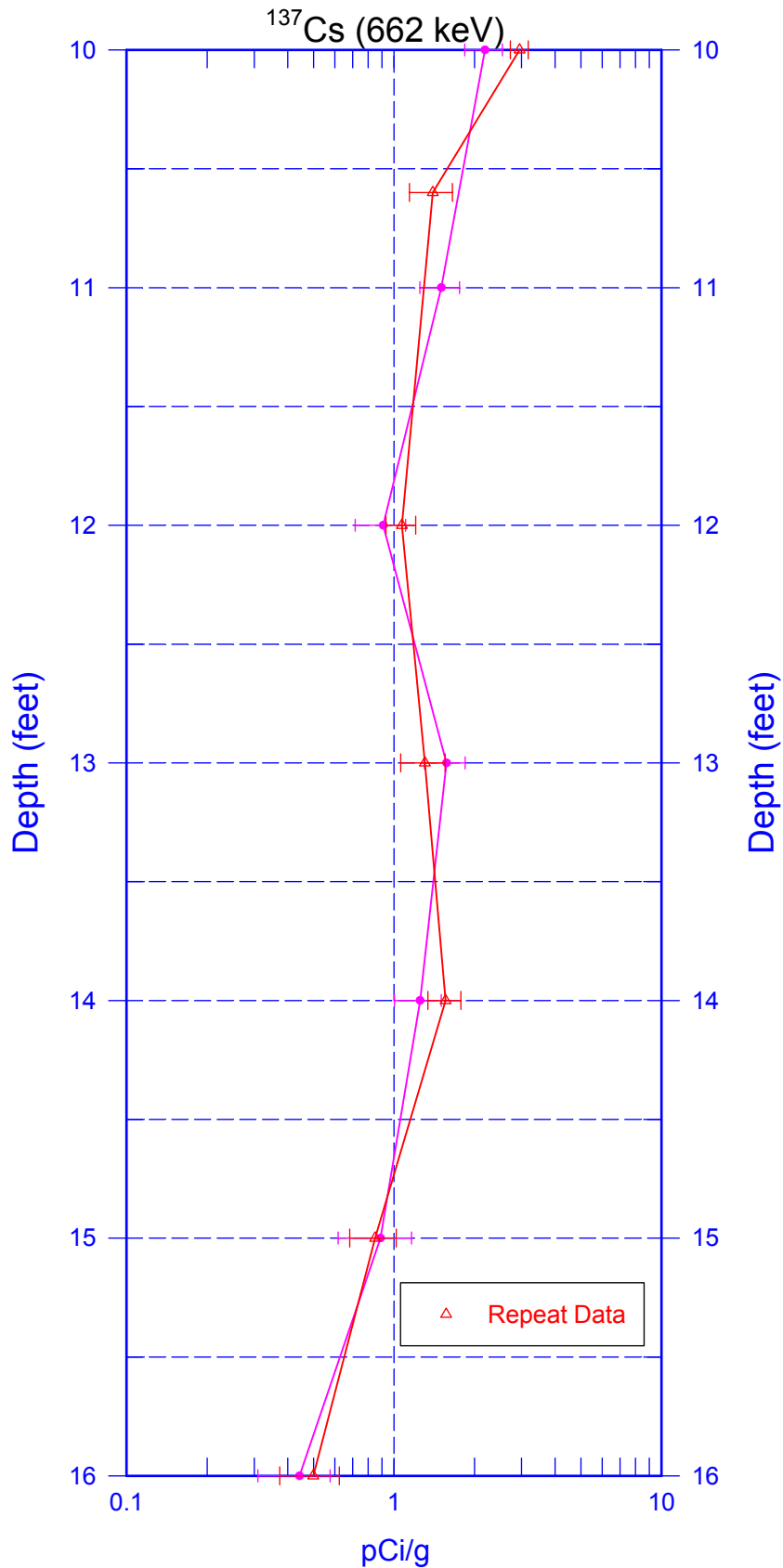
## Repeat Section of Natural Gamma Logs





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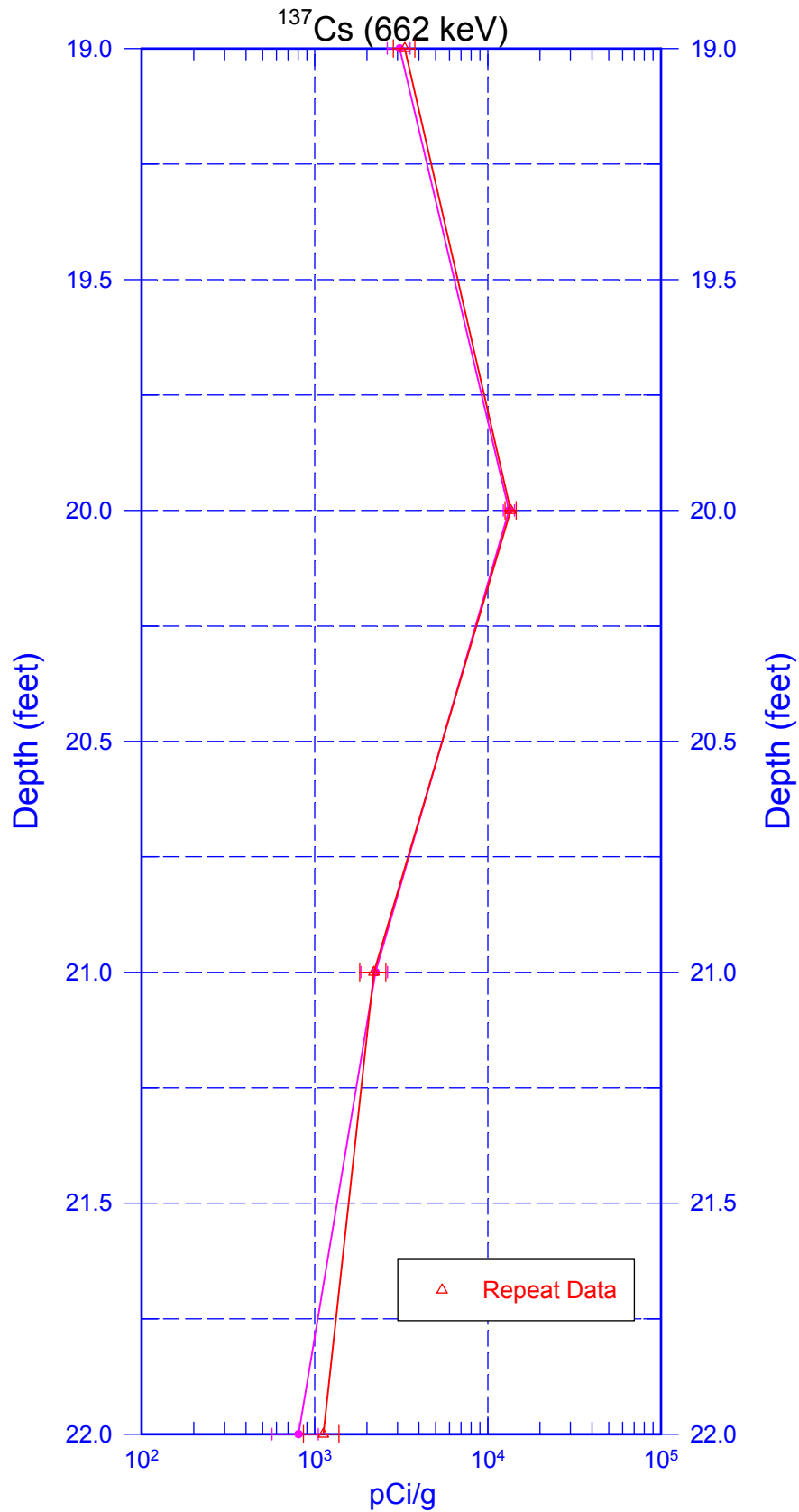
## Repeat Section of Man-Made Radionuclides



Zero Reference = Top of Casing

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## Repeat Section of High Rate



Zero Reference = Top of Casing

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## SGLS & RLS Comparison Plot

